

REMARKS

The titles of FIGS. 2, 3, 5, and 7 have been amended to include a recitation of (PRIOR ART). New FIG. 6A has been added. Paragraph [0023] has been added to the BRIEF DESCRIPTION OF THE DRAWINGS reference new FIG. 6A, which depicts a port inlet having a generally pyramidal shape as claimed in claims 4, 7, and 21. Paragraph [0047] of the specification has been amended to refer to FIG. 6A.

The Office Action mailed July 29, 2003, has been received and reviewed. Please add claims 28 and 29. Claims 1 through 29 are currently pending in the application. Claims 1 through 27 stand rejected. Applicants have amended claims 1 through 27 and respectfully request reconsideration of the application as amended herein.

Preliminary Amendment

Applicants' undersigned attorney notes the filing herein of a Preliminary Amendment on July 16, 2002, which filing was not acknowledged in the outstanding Office Action. Should the Preliminary Amendment have failed for some reason to have been entered in the Office file, Applicants' undersigned attorney will be happy to have a true copy thereof hand-delivered to the Examiner.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 3,621,924 to Lebourg

Claims 1 through 3, 5, 6, 19, 20, 24 and 26 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,621,924 to Lebourg (hereinafter "Lebourg"). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Lebourg discloses an apparatus for producing and retrieving subterranean cores, particularly cores of unconsolidated formations which apparatus comprises a means for cutting the formation to produce a core, a collapsible sleeve means disposed above the cutting means for internally receiving the core produced, and means for producing the fluid pressure on the outer surface of the sleeve, which fluid pressure is greater than the fluid pressure within the sleeve to maintain the sleeve in a collapsed position until the core is received within the sleeve. Pressure valves are provided to maintain the sleeve in collapsed position above the core but to exhaust fluid behind the sleeve as the core enters the sleeve and expands it.

Lebourg, as may be seen from FIGS. 1A and 1B thereof, discloses a fluid channel 20 that extends longitudinally along the apparatus, formed between the outer tubular section 25 and core barrel member 47. Also, Lebourg describes the fluid channel 20 as being annular. Col. 4, lines 53-56. The annular fluid channel 20 as shown in FIGS. 1A and 1B includes various tapered surfaces of tubular elements forming same, leading longitudinally downwardly into annular channel 68. Further, channel 59 allows drilling fluid to pass through the coring bit 30 to aid in the drilling operation. *See* FIG. 1B. Channel 59 is of constant size along its extent, extending between annular channel 68 and the face or bottom of the coring bit 30.

Claim 1, as presently amended, recites, *inter alia*, at least one bore extending through the bit body between at least one port inlet and at least one port outlet; wherein the at least one port outlet is formed in the face surface of the bit body; wherein the at least one port inlet is conically shaped and opens into the longitudinal cavity.

Lebourg discloses that channel 59 or bore extends through the coring bit 30. As seen in FIG. 1B, channel 59 does not extend between at least one port inlet that is conically shaped and a port outlet formed in the face surface of the bit body. Rather, the cross-sectional area of channel 59 as shown in FIG. 1B of Lebourg is constant along its extent.

The Office Action references channel 20 as a port inlet. However, channel 59 does not extend through the core bit between channel 20 and the face thereof. Nor is channel 20 formed generally along the inner diameter of the core bit. Rather, annular channel 20, as referenced by Lebourg, is defined between tubular sections 27 and 47, shown in FIG. 1B of Lebourg.

Therefore, it is respectfully submitted that channel 20, as disclosed by Lebourg, does not anticipate the port inlet as recited in the claim.

Applicants respectfully submit that Lebourg does not disclose each and every element of claim 1. Accordingly Applicants respectfully request reconsideration and allowance of independent claim 1.

Independent claim 2, as presently amended, recites, *inter alia*, at least one bore extending through the bit body between at least one port inlet and at least one port outlet; wherein the at least one port outlet is formed in the face surface of the bit body; wherein the at least one port inlet includes a first end having a first cross-sectional area joined to the at least one bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area, the second end opening into the longitudinal cavity.

Lebourg discloses that channel 59 or bore extends through the coring bit 30. As seen in FIG. 1B, channel 59 does not extend between at least one port inlet that includes a first end having a first cross-sectional area joined to the at least one bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area and opening into the longitudinal cavity and a port outlet formed in the face surface of the bit body. Rather, the cross-sectional area of channel 59 as shown in FIG. 1B of Lebourg is constant along its extent.

Additionally, it is respectfully submitted that channel 20, as disclosed by Lebourg, does not anticipate the port inlet as recited in the claim.

Applicants respectfully submit that Lebourg does not anticipate the port inlet as recited by the claim because Lebourg does not disclose each and every element of independent claim 2. Applicants respectfully request reconsideration and allowance of independent claim 2.

Dependent Claim 3 is allowable as depending from independent claim 2, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 3.

Independent claim 5, as presently amended, recites, *inter alia*, at least one bore extending through the bit body between at least one port inlet and at least one port outlet; wherein the at least one port outlet is formed in the face surface of the bit body; wherein the at least one port

inlet includes a first end having a first cross-sectional area joined to the at least one bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area, the second end opening into the longitudinal cavity.

As discussed above, channel 59, as disclosed by Lebourg, does not extend between at least one port inlet that includes a first end having a first cross-sectional area joined to the at least one bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area and opening into the longitudinal cavity and a port outlet formed in the face surface of the bit body. Rather, the cross-sectional area of channel 59 as shown in FIG. 1B of Lebourg is constant along its extent.

Additionally, it is respectfully submitted that channel 20, as disclosed by Lebourg, does not anticipate the port inlet as recited in the claim.

Therefore, Applicants respectfully submit that Lebourg does not anticipate the port inlet as recited by the claim because Lebourg does not disclose each and every element of independent claim 5. Applicants respectfully request reconsideration and allowance of independent claim 5.

Dependent Claim 6 is allowable as depending from independent claim 5, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 5.

Independent claim 19, as presently amended, recites, *inter alia*, a bore extending through the core bit between at least one port inlet and at least one port outlet; and wherein the at least one port outlet is formed in the face surface of the core bit; wherein the at least one port inlet includes a first end having a first cross-sectional area joined to the bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area.

As discussed above, channel 59, as disclosed by Lebourg, does not extend between at least one port inlet that includes a first end having a first cross-sectional area joined to the bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area because the cross-sectional area of channel 59 as shown in FIG. 1B of Lebourg is constant along its extent.

Additionally, it is respectfully submitted that channel 20, as disclosed by Lebourg, does not anticipate the port inlet as recited in the claim.

Claim 20 is allowable as depending from independent claim 19, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 20.

As to independent claim 24, the Office Action indicates that Lebourg discloses a method for reducing fluid flow through the above bore (59 and 68). Applicants respectfully submit that it is unclear how enlarging the cross-sectional area hydraulically *preceding* bore 58 and 69 would *reduce* the fluid flow therethrough, as it would appear that such a configuration would increase fluid flow through fluid paths that hydraulically follow an enlarged port inlet.

In any event, independent claim 24 is directed toward reducing the flow a quantity of fluid flowing into a narrow annulus defined by the wall of the cavity and the outside surface of the core shoe.

Applicants note, for clarity, that the narrow annulus between the cavity of the core bit 30 and the outside surface of the core shoe (not labeled) as shown by Lebourg is labeled 61 in FIG. 1B thereof.

Independent claim 24 recites, *inter alia*, a method for reducing a quantity of fluid flowing from an annular region bounded by a wall of a cavity through a core bit and an outside surface of a core shoe disposed therein, and into a narrow annulus therebelow defined by the wall of the cavity and the outside surface of the core shoe. Further, independent claim 24 also recites, providing a plurality of ports, each port including a bore extending through the core bit between an inlet and an outlet and reducing a quantity of fluid flowing into the narrow annulus, the reducing comprising enlarging a cross-sectional area of the port inlet of each port of the plurality of ports relative to a cross-sectional area of the bore of each port of the plurality of ports, each port inlet of the each port proximate to the annular region.

As mentioned above, it appears that the configuration of Lebourg would *increase* rather than decrease the flow through the narrow regions 61 as disclosed by Lebourg. Further, Applicants respectfully submit that Lebourg does not disclose enlarging a cross-sectional area of the port inlet of each port of the plurality of ports relative to a cross-sectional area of the bore of each port of the plurality of ports, each port inlet of the each port proximate to the annular region.

Rather, the cross-sectional area of channel 59 as shown in FIG. 1B of Lebourg is constant along its extent.

Applicants respectfully submit that Lebourg does not disclose each and every element of independent claim 24. Therefore, Applicants respectfully request reconsideration and allowance of independent claim 24.

Independent claim 26 recites, *inter alia*, imparting circumferential flow to fluid collecting in an annular reservoir in fluid communication with the narrow annulus and receiving the circumferentially flowing fluid in a plurality of ports in fluid communication with the annular reservoir.

Applicants respectfully submit that Lebourg does not disclose imparting circumferential flow to fluid within an annular reservoir in fluid communication with the narrow annulus. Applicants respectfully request reconsideration and allowance of independent claim 26.

Anticipation Rejection Based on U.S. Patent No. 4,607,710 to Radford

Claims 13 through 16 and 27 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,607,710 to Radford (hereinafter "Radford"). Applicants respectfully traverse this rejection, as hereinafter set forth.

Radford discloses a positively driven full closure core catcher comprising an inner tube shoe into which a plurality of windows has been cut. In each window is a corresponding one of a plurality of flapper valves, the flapper valves being spring-biased to a withdrawn position outside of the interior of the inner tube shoe. A cam member is in sliding contact with an inclined rear surface of the flapper valve and a collet assembly is coupled to a cylinder on which the cam is fixed in order to typically keep the cam and cylinder in a fixed longitudinal relationship with respect to the inner tube shoe. However, as the inner barrel is raised the collet latch of the collet assembly contacts a floating outer tube ring which causes the collet latch to bend outwardly and release from the inner tube shoe. The cylinder and cam are then longitudinally fixed within the coring tool and the inner tube and inner tube shoe continue to be longitudinally displaced, causing the cam to ride down and close the flapper valves.

Independent claims 13 and 15 each recite, *inter alia*, at least one surface feature disposed on a wall of the cavity configured to individually impart resistance to fluid flow in a narrow annulus defined by the wall of the cavity and an outside surface of the core shoe. Independent claims 13 and 15 also each recite, *inter alia*, at least one cutter disposed on the face surface.

Radford discloses, with reference to FIGS. 1 and 2, that drilling fluid travels longitudinally downward along annulus 54 between inner tube 20 and the interior of the drill pipe or bit. Further, Radford describes, "Collet 42 is characterized by a lower, circumferentially continuous cylindrical band 56 from which a resilient arm or tine 58 extends longitudinally upwardly terminating in a collet block 60." Col. 4, lines 15-18.

The Office Action states that Radford discloses surface feature (62) disposed on the wall of the cavity and that the feature imparts a resistance to fluid flow in a narrow annulus defined by the wall of the cavity and the core shoe.

Applicants respectfully submit that the collet block 60 as disclosed by Radford does not appear configured to individually impart resistance to fluid flow in a narrow annulus. Specifically, Radford discloses, "After the point of contact is established, the inclined surfaces will cause collet block 60 to be displaced radially outward to an extent which ultimately destroys the overlapping relationship between surface 64 of collet block 60 and the upper surface of flange 52. At this point, collet latch 42 is substantially longitudinally fixed within the drill string or bit. As inner barrel 20 and shoe 22 continue to move upwardly, cam assembly 44 will similarly remain longitudinally fixed by virtue of its interfitting relationship with collet latch 42, as established by the juxtaposition of cylindrical band 56 within a mating shoulder 72 defined within the lower portion of cam assembly 44." Col. 4, lines 42-55. Applicants respectfully submit that it appears that the collet block 60 is configured to perform a mechanical function rather than impart a resistance to fluid flow. Moreover, FIG. 3 shows that grooves (unlabeled) exist between each collet block, thus allowing fluid flow therethrough.

Applicants respectfully submit that Radford does not disclose a surface feature disposed on the wall of the cavity. Rather, collet block 60 extends from circumferentially continuous cylindrical band 56 *from a resilient arm or tine 58*.

In addition, Applicants respectfully submit that Radford does not disclose at least one cutter disposed on the face surface of the bit body.

Accordingly, Applicants respectfully submit that Radford does not disclose each and every element of the claim in as complete detail as is contained therein. Applicants respectfully request reconsideration and allowance of independent claim 13.

As to dependent claims 14 and 16, each recite that at least one surface feature is selected from the group consisting of: at least one annularly extending squared edge; at least one annular, rectangular cross-sectional relief; at least one annular, triangular cross-sectional relief; and at least one annular, circular cross-sectional relief.

Applicants respectfully submit that Radford does not disclose each and every element of the claims. Even assuming, *arguendo*, collet block 60 were a surface feature, collet block 60 fails to disclose the feature configurations of dependent claim 14 or dependent claim 16, respectively. Applicants note that Radford does not appear to teach a relief or edge formed in the wall of the cavity whatsoever. Further, dependent claim 14 is allowable as depending from independent claim 13, which is allowable. Likewise, dependent claim 16 is allowable as depending from independent claim 15, which is allowable.

Applicants respectfully request reconsideration and allowance of dependent claims 14 and 16.

Independent claim 27 recites, *inter alia*, imparting circumferential flow to fluid collecting in an annular reservoir in fluid communication with the narrow annulus.

Applicants respectfully submit that Radford does not disclose imparting circumferential flow to fluid collecting in an annular reservoir in fluid communication with the narrow annulus. Applicants respectfully request reconsideration and allowance of independent claim 27.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 3,621,924 to Lebourg

Claims 4, 7 through 12, 17, 18, 21 through 23 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lebourg (U.S. Patent No. 3,621,924). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 4, 7 through 12, 17, 18, 21 through 23 and 25 are improper because Lebourg does not teach or suggest all the claim limitations.

The disclosure of Lebourg is discussed hereinabove.

Dependent claim 4 is allowable as depending from independent claim 2, which is allowable. Applicant respectfully requests reconsideration and allowance of dependent claim 4.

Dependent claim 7 is allowable as depending from independent claim 5, which is allowable. Applicant respectfully requests reconsideration and allowance of dependent claim 7.

Independent claim 8 recites, *inter alia*, at least one bore extending through the bit body between at least one port inlet and at least one port outlet; wherein the at least one port inlet forms an angle of approach relative to the flow path defined by the annular region proximate the at least one port inlet of between about zero and 44 degrees; wherein the at least one port outlet is formed in the face surface of the bit body.

Similarly, independent claim 10 recites, *inter alia*, at least one bore extending through the bit body between at least one port inlet and at least one port outlet; wherein the at least one port

inlet forms an angle of approach relative to the flow path defined by the annular region proximate the at least one port inlet of between about zero and 44 degrees; wherein the at least one port outlet is formed in the face surface of the bit body.

The Office Action states that “it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the port inlet of Lebourg with an approach angle between 0 and 44 degrees, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.”

Applicants respectfully submit that Lebourg does not teach or suggest all the claim limitations of independent claims 8 or 10. Specifically, Lebourg fails to teach or suggest a flow path defined by the annular channel 68 proximate the port inlet whatsoever, nor teach or suggest an approach angle of a port inlet relative thereto.

Moreover, there is no motivation to make the proposed combination. Lebourg fails to supply such motivation because the disclosure of Lebourg merely acknowledges that channels 61 communicate between annular channel 68 and the interior of the core to equalize the pressure therebetween, without any more. Col. 4, lines 68-74.

Applicants respectfully request reconsideration and allowance of independent claims 8 and 10.

Dependent claim 9 is allowable as depending from independent claim 8, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 9.

Dependent claim 11 is allowable as depending from independent claim 10, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 11.

Independent claim 12, as presently amended, recites, *inter alia*, wherein the at least one port inlet opens into the cavity at a region thereof defining an annular reservoir, the annular reservoir configured to induce fluid recirculation zones in fluid passing therethrough.

Applicants respectfully submit that Lebourg does not teach or suggest all the claim limitations of independent claim 12. Specifically, Applicants respectfully submit that Lebourg does not teach or suggest an annular reservoir configured to induce fluid recirculation zones in fluid passing therethrough. Accordingly, Applicant respectfully requests reconsideration and allowance of independent claim 12.

Independent claim 17, as presently amended, recites, *inter alia*, wherein the at least one port inlet opens into the annular region and includes a first end having a first cross-sectional area joined to the at least one bore and extends to a second end having a second cross-sectional area larger than the first cross-sectional area, the at least one port inlet forming an angle of approach relative to the flow path defined by the annular region proximate the at least one port inlet of between about zero and 44 degrees.

As discussed above, Lebourg teaches channel 59, which does not include a first end having a first cross-sectional area joined to another end of the at least one bore and extending to a second end having a second cross-sectional area larger than the first cross-sectional area. Rather, the cross-sectional area of channel 59 as shown in FIG. 1B of Lebourg is constant along its extent. In addition, Lebourg fails to teach or suggest either a flow path defined by annulus 68 or forming an approach angle relative thereto. Therefore, Applicants respectfully submit that Lebourg fails to teach or suggest an angle of approach relative to the flow path defined by the annular region proximate the at least one port inlet of between about zero and 44 degrees.

Applicants respectfully request reconsideration and allowance of independent claim 17.

Dependent claim 18 is allowable as depending from independent claim 17, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 18.

Independent claim 22 recites, *inter alia*, a bore extending through the core bit between at least one port inlet and at least one port outlet; and wherein the at least one a port inlet forms an angle of approach relative to the flow path defined by the annular region proximate the at least one port inlet of between about zero and 44 degrees.

Applicants respectfully submit that Lebourg fails to teach or suggest a flow path defined by annulus 68 or forming an approach angle relative thereto.

Accordingly, Applicants respectfully request reconsideration and allowance of independent claim 22.

Dependent claim 23 is allowable as depending from independent claim 22, which is allowable. Applicant respectfully requests reconsideration and allowance of dependent claim 23.

Independent claim 25 recites, *inter alia*, imparting an angle of between about zero and 44 degrees between a flow path and at least one port inlet of a plurality of ports proximate to the annular region; and receiving fluid from the annular region into the at least one port inlet.

Applicants respectfully submit that Lebourg fails to teach or suggest a flow path in annulus 68 or forming an approach angle relative thereto. Accordingly, Applicant respectfully requests reconsideration and allowance of independent claim 25.

ENTRY OF AMENDMENTS

The amendments to the specification, drawings, and to claims 1 through 27 and the addition of new claims 28 and 29 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings.

CONCLUSION

Claims 1 through 29 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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Attachment: Formal Drawings